

HOW TO... Create equations in Office

It can be tricky laying out mathematical equations clearly and accurately in Microsoft Office. Mike Bedford gets the right answer with the Equation Editor

Trying to type an equation in an Office document is a nightmare. Putting the equation on one line means, if it is a lengthy equation, having to use a lot of brackets. For example, $a = ((b + c)/(d + e))^2$. You could try and enter it on more than one line, so that it looks like:

$$a = \left(\frac{b+c}{d+e} \right)^2$$

However, when you're trying to enter it as text, making sure all the lines remain aligned is a real headache.

What many people don't realise is that Microsoft Office has an equation editor that lets you create properly formatted equations just like the ones you see in textbooks. Here we present a couple of examples that, between them, show you how to use most of the important features of the Microsoft Equation Editor. We're using the Equation Editor to insert equations into a PowerPoint presentation, but the same method can be used to put equations into Word documents, Excel workbooks or even an email message in Outlook. There are slight differences in the way it works from one application to another, but the basic principles are the same.

The Equation Editor is supplied on all Microsoft Office distribution discs, but it might not have been installed on your PC. To check, start up PowerPoint and select Object from the Insert menu. Make sure that Create New is selected on the left-hand side of the Insert dialog box, and scroll

down the Object type list looking for Microsoft Equation 3.0 (or an earlier version if you have an old version of Office). If it's there, you're OK. If not, you'll need to install it from your Office distribution disc before continuing.

1 Start PowerPoint and ensure that you have a blank presentation into which you can practise entering equations. Make sure the cursor is at a suitable place to insert an equation. Select Object from the Insert menu. Click on the Create New radio button in the Insert dialog box and select Microsoft Equation 3.0 in the Object type list box, then click OK. The Equation Editor window will be displayed.

2 The Microsoft Equation Editor doesn't try to match the size of the text it uses in equations to that used in your document. The first job, therefore, is to define the sizes of the various types of text that it uses to build up equations. Select Define from the Size menu of the Equation Editor window. The Sizes dialog box is displayed. Click on the Defaults button and make a note of the sizes shown for Full, Subscript/Superscript, Sub-Subscript/Superscript, Symbol and Sub-symbol. Change the size of Full to the point size of the normal text in your presentation and then change the other sizes so that they're in the same proportions to Full as they were in the default sizes. Click OK.

3 In the same way that we've defined the text sizes to match those in the PowerPoint presentation,

you might also want to define the fonts, though it's perfectly acceptable to use a different font for equations to make them stand out.

Select Define from the Style menu and then choose the appropriate fonts from the various drop-down menus in the Styles dialog box. You can also define whether each style is bold and/or italic, but you should bear in mind that there are certain conventions for the text in equations. In particular, letters that represent variables are usually in italics (and often a serif font too) and those for functions (such as sin, cos, tan) are in non-italics.

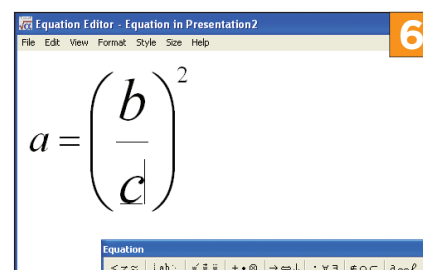
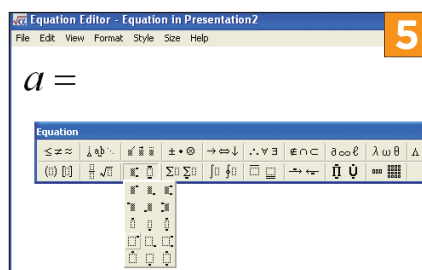
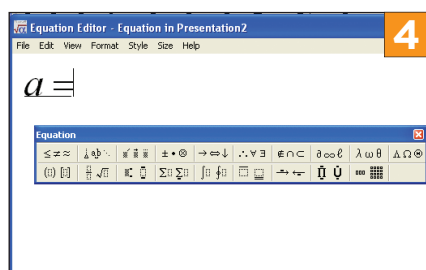
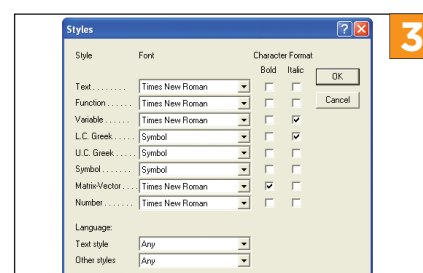
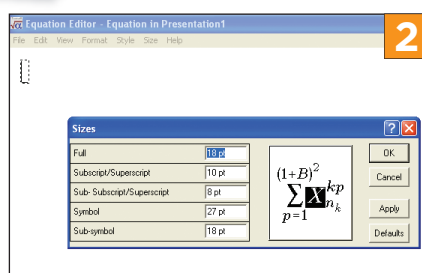
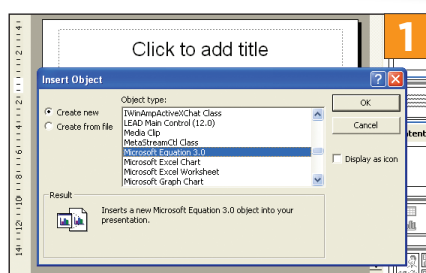
4 We will now enter the following simple equation to give you a feel for the way in which equations are built up:

$$a = \left(\frac{b}{c} \right)^2$$

In the Equation Editor window, select Toolbar from the Display menu. The Equation toolbar will be displayed. Entering the first part of the equation is simple enough. Type 'a=', without the quote marks, and the text will appear inside the dotted box, which is the place-holder for the equation.

5 Equations are built up using templates that contain place-holders into which you can type text. Alternatively, you can enter a template into the place-holders of another template, resulting in 'nested' templates. The next job, therefore, is to identify and insert the outermost template, which is the superscript 2. If

EXPERT TIP
To edit equations, double-click on an equation in any Office application and the Equation Editor will open up, allowing you to make changes.



you hover your cursor over a button on the Equation toolbar, a tooltip with its name will appear. Click on a button in the toolbar and a menu containing a number of other buttons will pop up. Unfortunately, these buttons don't have convenient tooltips containing their names, so for buttons in menus we'll let you know which row and button to click. Click on the Subscript and Superscript templates button (the third from the left on the bottom row) on the Equation toolbar and then click on the Superscript template (the first button on the fourth row) of the drop-down menu. Two dotted boxes will appear to the right of the 'a='. Click in the small box and enter 2, to get a superscript.

6 Now click in the large box, where we're going to insert the next lower level of the template, which is the round brackets. Click on the fences templates button (the first on the bottom row) and then on the round brackets template (the first button on the top line) of the drop-down menu. Round brackets will appear with a dotted box between them. Click in the new box. This is where we will insert the final template, which is divide. Click on the fraction and radicals templates button (the second from the left on the bottom row) and then on the Divide template (the first button on the top line) of the drop-down menu. A horizontal line denoting division will appear with dotted boxes above and below it. Click in the top box and enter 'b'. In the bottom box, enter 'c'.

7 This completes the equation so select Exit and Return to presentation in the File menu. The Equation Editor will close and the completed equation will appear in the PowerPoint slide.

8 Now we'll enter the following equation, which will illustrate some other features of the Equation Editor:

$$i(\theta) \propto \int_0^{\infty} 4\pi r^2 g(r) \frac{\sin sr}{sr} dr$$

Again, make sure the cursor is at a suitable place for you to practise inserting an equation and start the Equation Editor as you did in Step 1. Type 'i(' without the quotes and then enter a

Theta symbol by clicking on the Greek characters (lower case) button on the Equation toolbar and selecting Theta – the second button on the fifth row. Enter a close bracket to complete the left-hand side of the equation. Here we've put something in brackets by typing in the brackets directly. This is usually easier than using a Brackets template as long as the contents of the brackets are on a single line.

9 Click on the Relational symbols button and select the Proportional symbol from the drop-down menu (it's the first button on the sixth row). Next select the Integral symbols button; when its menu appears, click on the symbol for a single integral with upper and lower limits (the third button on the first row). An integral symbol will appear with two small boxes and one large box. Click in the top small box and enter an infinity symbol, which you'll find by pressing Miscellaneous symbols and selecting the third button on the first row from the menu. In the bottom small box, enter the figure zero.

10 Type '4' in the empty large box and enter a lower-case pi – click on the Greek characters (lower case) button, and the lower case pi in the menu that appears. Type 'r'. Click on the Subscript and Superscript button and select the first button in the first row. A small box will appear above and to the right of the 'r'. Click in that box and type '2'. This is an alternative way of adding a superscript to the method we saw in Step 5. It deviates slightly from the template approach (since the 'r' didn't have to go in its own place-holder), but in many cases you'll find it an easier way of working.

11 Click to the right of the equation so far. You'll notice that as the cursor moves to the right it gets larger, indicating that anything you now enter will be to the right of the equation rather than inside the superscript box, next to the '2'. Type 'g(r)', click on the Fraction and radicals button and select Divide (the first button on the first row). A horizontal line will appear with boxes above and below it. Click in the top box and type 'sinsr'. The Equation Editor recognises that 'sin' is the name of a

EQUATION EDITOR HINTS AND TIPS

In Step 3 we saw how you can define the fonts for the various components of an equation. If you change most of them, the worst you could end up with is a rather unconventional, though still intelligible, equation. However, be wary about changing any font that appears by default as Symbol. As its name suggests, this font contains characters such as Greek letters and mathematical symbols. Unless you change it to another font with exactly the same characters, you'll end up with unintelligible equations.

Just as we were able to fine-tune the horizontal spacing between symbols in Step 12, the Equation Editor allows you to control lots of other spacings that define how an equation appears. To get a feel for what's available, select Spacing from the Format menu and scroll down the list of parameters, all of which you can modify. If the textual description of the parameter isn't clear, the box to the right illustrates graphically the meaning of each parameter as it's selected.

mathematical function so it inserts a space between the 'sin' and the 'sr'. It also uses non-italics for the 'sin', which is a function, and italics for the 'sr', which is a variable. Click in the bottom box and type 'sr'. Finally, click to the right of the equation and type 'dr'.

12 Our equation is now more or less complete. However, you'll notice that the 'r' symbol seems to merge into the lower-case pi, which comes before it. This is a common problem, especially with Greek letters, but the Equation Editor provides fine control over the spacing so you can adjust it until you get the result you want. Click between the lower-case pi and the 'r' to reposition the cursor. Now click on the Spaces and ellipses button on the Equation toolbar. In the menu that appears, the second and third buttons on the first row, and the first, second and third buttons on the second row, all allow you to add space of increasing amounts. You might have to experiment to get the right amount but, for now, select the third button on the first row. The 'r' will move the correct distance from the lower-case pi. Select Exit and Return to presentation in the File menu. **CS**

